Clean Coal Power Initiative

Funding Schedule by Activity

(dollars in thousands)

	FY 2004	FY 2005	FY 2006	$ Change	% Change
Clean Coal Power Initiative					
Clean Coal Power Initiative/FutureGen	165,171	49,305	50,000	+695	+1.4%
FutureGen	8,640	17,750	18,000a	+250	+1.4%
Total, Clean Coal Power Initiative	173,811	67,055	68,000	+945	+1.4%

Description

The mission of the Clean Coal Power Initiative (CCPI) is to enable and accelerate deployment of advanced technologies to ensure that the United States has clean, reliable, and affordable electricity. The CCPI is a cost-shared partnership between the government and industry to develop and demonstrate advanced coal-based power generation technologies (the most advanced example of which will be FutureGen). The mission of the FutureGen project is to establish the technical capability and potential economic feasibility of co-producing electricity and hydrogen from coal with essentially zero emissions, including carbon (sequestration).

Benefits

The Clean Coal Power Initiative subprogram by 2010 will initiate demonstration of advanced coal-based power generation technologies capable of achieving 45 percent electrical efficiency, with environmental and economic performance capable of achieving 90 percent Hg removal at a cost of 70 percent of current technology by 2010, 0.15 lb/MMBtu NO_x at 75 percent of the cost of current technology (selective catalytic reactors), that can be configured to co-produce heat, fuels, chemicals or other useful byproducts; and, provide a deployment-ready suite of advanced technologies that can produce substantial near-, mid-, and long-range economic and environmental public benefits. The CCPI subprogram will create public/private partnerships to provide technology to ensure continued electricity production from the extensive U.S. fossil fuel resource, including control technologies to permit reasonable-cost compliance with emerging regulations, and ultimately, by 2015, demonstrate zero emission plants (including carbon) that are fuel-flexible, and capable of multi-product output with gross efficiencies in the 60 percent range.

The FutureGen research and development project is aimed at establishing the technical capability and potential economic feasibility of co-producing electricity and hydrogen from coal with essentially zero emissions. The project enhances the continued and expanded use of our most abundant and lowest cost domestic energy resource, coal. FutureGen will require integration of subsystems and components yet to

[a] The FY 2005 Appropriation defers $257,000,000 of old Clean Coal funds for future use. The Department proposes canceling those funds in FY 2006 and providing them as an advance appropriation in FY 2007 for future use in the FutureGen project.

be developed, such as gasification with low cost CO_2 capture and storage technology, and thus involves considerable risk. However, the public benefits when we succeed will be enormous. In order to assure that FutureGen is successful, it will be supported by a clean coal R&D effort focused on all the key technologies needed - such as carbon sequestration, membrane technologies for oxygen and hydrogen separation, advanced turbines, fuel cells, coal to hydrogen conversion, gasifier related technologies, and other technologies, funding for which is included in the Administrations FY 2006 budget request. CCPI demonstrations directly support the FutureGen project by driving down the costs and risks of IGCC systems and other coal-based power and emissions control technologies whose extensions are critical to the success of FutureGen.

Coal is the most abundant U.S. energy resource, with domestic reserves equal to the energy potential of the world's oil reserves. About 90% of all coal produced in the U.S. is used for electricity generation, and over half of our Nation's electricity is produced by coal-fired power plants. Meeting our Nation's rising demands for clean, reliable, and affordable electricity will require the use of coal for the foreseeable future. We must therefore develop and demonstrate technologies that will enable the continued use of coal to meet our growing demand for electricity in an environmentally sound manner.

The Bush Administration is advancing its vision in clean coal research. The Clean Coal Power Initiative (CCPI) is an effort within the Department of Energy's Fossil Energy program that combines industry investments in research and development with federal matching funds for research, development and demonstration of advanced technologies on coal-fired power plants. The Administration is requesting $50 million in FY 2006 to fund joint government-industry-funded demonstration projects to reduce risks on new technologies that can enhance the reliability, efficiency, and environmental performance of coal-fired power generators. This FY 2006 funding will support the third round of demonstration projects under the Clean Coal Power Initiative, incorporating the latest advances in clean coal technologies. The FutureGen project and the CCPI demonstrations respond to the National Energy Policy call to address the reliability and affordability of the Nation's electricity supply, particularly from its coal-based generation, and are a key component of the President's commitment to research and development of clean coal technologies to meet this challenge. By enabling advanced technology to overcome technical risks and bringing them to the point of commercial readiness, the CCPI accelerates the development of power and hydrogen production using coal while proving the feasibility of integrating carbon sequestration and power production and facilitates the movement of technologies into the market place that are emerging from the core research and development activities and directly responds to President's Clear Skies Initiative and Global Climate Change Initiative to reduce emissions of air pollutants (particularly NO_x and mercury) and carbon dioxide.

Currently there are six ongoing projects selected under the CCPI Round 1 solicitation, and four projects were recently selected under the second round of CCPI: two advanced IGCC projects, one integrated emissions reduction project, and one neural-network based plant control and optimization project. In FY 2003, the first round of CCPI projects commenced and NEPA was initiated including the conduct of public scoping meetings for three of the projects that will require Environmental Impact Statements. NEPA was completed for four of six Power Plant Improvement Initiative (PPII) projects and those projects are under construction or in operation. In FY 2004, five out of the six CCPI projects selected in the first round commenced and sufficient CCPI funding existed to support a solicitation for a second round of projects. FY 2005 funding enables the second round of CCPI projects to be awarded. In FY

2005, four projects were selected from the second round solicitation. FY 2006 funding will go towards supporting the solicitation of a third round of projects.

Detailed Program Justification

(dollars in thousands)

	FY 2004	FY 2005	FY 2006
▪ **Clean Coal Power Initiative**.....	**163,471**	**48,812**	**49,500**

For FY 2006, in support of the President's Coal Research Initiative, continue the Clean Coal Power Initiative (CCPI) to research, develop and demonstrate commercial readiness advanced clean coal-based technologies that enhance electricity reliability, increase generation capacity, and provide clean, affordable power. Projects selected under the second solicitation will be negotiated for award and initiation. For projects selected under the first solicitation, continue operation for two projects and initiate operation for We Energies' TOXECON sorbent injection project. Initiate construction for Western Greenbrier's fluidized-bed co-generation and fly-ash utilization project and the University of Kentucky Research Foundation's coal-ash beneficiation processing project. Continue design of the Gilberton coal-to-clean fuels project. *Participants include: University of Kentucky Research Foundation, Neuco, Inc., Great River Energy, Western Greenbrier Co-Generation, LLC, Waste Management Processors, Incl., PTY, LLC, Wisconsin Electric Power Company, Peabody Energy and Airborne Clean Energy, Southern Company, Excelsior Energy Inc., ConocoPhillips, and Pegasus Technologies, Inc.*

For FY 2006, within the Power Plant Improvement Initiative (PPII) program, initiate construction of CONSOL Energy's multi-pollutant Circulating Dry Scrubber system and TIAX's advanced hybrid system for NO_x control. *Participants include: CONSOL Energy, Inc., and TIAX, LLC.*

For FY 2005, in support of the President's Coal Research Initiative, continue within the Clean Coal Power Initiative (CCPI) to research, develop, and demonstrate commercial readiness advanced clean coal-based technologies that enhance electricity reliability, increase generation capacity, and provide clean, affordable power. Initiate negotiations with the second round of projects under the CCPI. For projects selected under the first solicitation, initiate operation for two projects, Neuco's plant-wide optimization system employing neural networks Great River Energy's coal dryer. Initiate construction activities for the We Energies' TOXECON sorbent injection system project for multi-pollutant control and Western Greenbrier's fluidized-bed co-generation and fly-ash utilization project. Award and initiate design activities for the University of Kentucky Research Foundation project and Gilberton coal-to-clean fuels project. *Participants include: University of Kentucky Research Foundation, Neuco, Inc., Great River Energy, Western Greenbrier Co-Generation, LLC, Waste Management Processors Inc., PTY, LLC, , and Wisconsin Electric Power Company, Peabody Energy and Airborne Clean Energy, Southern Company, Excelsior Energy Inc., and Conoco Phillips, and Pegasus Technologies, Inc.*

For FY 2005, within the Power Plant Improvement Initiative (PPII) program, complete four of six active projects including: Tampa Electric's Neural Network-Sootblower Optimization project; Sunflower Electric's optimized control system project; Universal Aggregates' ash utilization

project; and Otter Tails' advanced particulate collector demonstration. Award and initiate design activities for CONSOL Energy's multi-pollutant Circulating Dry Scrubber system and TIAX's advanced hybrid system for NO_x control. *Participants include: Otter Tail Power Corp. with UNDEERC and W. L. Gore & Associates, Tampa Electric Co., Universal Aggregates, LLC, Sunflower Electric Power Corp., CONSOL Energy, Inc., and TIAX, LLC.*

For FY 2004, within the Clean Coal Power Initiative (CCPI) program, provided funding to support issuing a second solicitation leading to expanding the portfolio of demonstration projects. Awarded and initiated design activities for Neuco's optimization software project; We Energies' TOXECON sorbent injection system project for multi-pollutant control; Western Greenbrier's fluidized-bed co-generation and fly-ash utilization project; and Great River Energy's lignite coal dryer project. Continued negotiations for the Gilberton coal-to-clean fuels and power project. Initiated evaluation of proposals submitted from the second solicitation. *Participants included: University of Kentucky Research Foundation, Neuco, Inc., Great River Energy, Western Greenbrier Co-Generation, LLC, LG&E Energy Corp; Waste Management Processors, Inc., PTY, LLC, Colorado Springs Utilities, and Wisconsin Electric Power Company.*

For FY 2004, within the Power Plant Improvement Initiative (PPII) program, initiated operation for Tampa Electric's Neural Network-Sootblower Optimization project; Sunflower Electric's optimized control systems project; and Universal Aggregates' ash utilization project to product lightweight aggregate. Continued demonstration testing of the Advanced Hybrid Particulate Collector at Otter Tail Power's Big Stone Station. Continued negotiation of CONSOL Energy's multi-pollutant Circulating Dry Scrubber system and TIAX's advanced hybrid system for NO_x control. *Participants include: Otter Tail Power Corp. with UNDEERC and W. L. Gore & Associates, Tampa Electric Co., Universal Aggregates, LLC, Sunflower Electric Power Corp., CONSOL Energy, Inc., and TIAX, LLC.*

- **FutureGen** **8,640** **17,572** **17,820**

For FY 2006, the FutureGen project will continue. The Environmental Impact Statement and Record of Decision will be completed, site characterization and monitoring activities will continue for various candidate sites, and technology assessments and preliminary design activities will continue. Permitting activities will be initiated during FY 2006 and must be completed before start of construction. Ordinarily, only a few permits (e.g., air, water, construction) require long lead times and/or public hearings. However, a large project such as FutureGen will require many state and local permits, and their issuance will therefore be staggered between FY 2006 and FY 2007. The Department also proposes an advance appropriation for FY 2007 of $257 million from balances in the Clean Coal Technology account for FutureGen.

For FY 2005, under the FutureGen project, NEPA activities will continue. Site monitoring and characterization will be initiated during FY 2005. Information gleaned from design/engineering studies will be incorporated into detailed design activities, as appropriate. Typically, baseline environmental monitoring data must be gathered to support not only NEPA and Permitting activities, but also Design/Engineering. Candidate technologies will be considered and

(dollars in thousands)

FY 2004	FY 2005	FY 2006

evaluated. Options will be considered in terms of success potential and leading edge characteristics. Preliminary design activity will include conceptual design of the plant's power train, air separation units, turbine and steam cycles and other generic balance of plant auxiliary systems. *Participants include: TBD.*

For FY 2004, the NEPA process was initiated along with the conceptual plant design. Assessments of the availability of key cutting edge technologies were conducted. Analyses were conducted to establish critical site requirements. Detailed project schedules and competitive procurement plans for key components and technologies were developed. *Participants include:TBD.*

▪ **Program Support**	**1,700**	**671**	**680**
Fund technical and program management support.			
Total, Clean Coal Power Initiative	**173,811**	**67,055**	**68,000**

Explanation of Funding Changes

	FY 2006 vs. FY 2005 ($000)
Clean Coal Power Initiative/FutureGen	
▪ The FY 2006 request for CCPI is comparable to the FY 2005 enacted budget before reductions	+688
FutureGen	
▪ The FY 2006 request for FutureGen is comparable to the FY 2005 enacted budget before reductions	+248
Program Support	+9
Total Funding Change, Clean Coal Power Initiative	**+945**

The following tables provide projected funding profiles for the FutureGen project.

Table 1. FutureGen Project Funding by Fiscal Year.

FutureGen Project Funding Profile ($M)					
FY	Cash Flows				
	DOE Direct	DOE Sequestration*	FutureGen Consortium	International	Total
2004	9		2		11
2005	18		7		25
2006	18		7		25
2007	50		20	5	75
2008	100		38	6	144
2009	89	24	43	8	164
2010	57	24	32	10	123
2011	33	4	18	10	65
2012	23	34	18	12	87
2013	26	34	19	12	91
2014	34		19	7	60
2015	39		24	7	70
2016-2018	4		3	3	10
Total	500	120	250	80	950
* $120 million of funding from the Sequestration program will be used to partially fund the sequestration aspects of the FutureGen project.					

Table 2. FutureGen Project Funding by Major Cost Element.

FutureGen Major Cost Elements by Fiscal Year ($'s millions)														
Major Cost Elements	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016-2018	Total
Plant Def. & NEPA	11	25	25	20										81
Base Plant Proc. & Const.				55	140	134	79	15			27	30		480
Shakedown & Operation								40	35	40	33	40		188
Sequestration					4	30	44	10	52	51				191
Monitoring													10	10
FY Totals	11	25	25	75	144	164	123	65	87	91	60	70	10	950